Amendments to the Drawings:

The attached sheet of drawings includes changes to FIG. 8. This sheet, which includes Fig. 8, replaces the original sheet including Fig. 8.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

REMARKS/ARGUMENTS

Summary of Interview

Applicants wish to thank the Examiner for extending the courtesy of an interview on April 10, 2007. Proposed amendments to the claims similar to those presented above were submitted prior to the interview. During the interview proposed claims 1, 14, 21 and 28 and U.S. Patents 5,805,700 to Nardone et al. (the Nardone et al. patent) and 7,151,832 to Fetkovich et al. (the Fetkovich et al. patent) were discussed. In addition, the distinction between transport based compression and frame based compression was discussed. Agreement was reached that the proposed claims were allowable over the Nardone et al. and the Fetkovich et al. patents. The Examiner requested that we submit remarks accompanying this amendment that outline support within the specification for the amendments.

Amendment to FIG. 8

FIG. 8 has been amended in accordance with the recommendations in the Office action.

Support for claim 1

Claim 1 is amended as follows:

1. A method for producing a protected stream of compressed video content, said method comprising:

receiving an input stream of compressed video content containing a sequence of frames;

generating a frame encryption key and including the encryption key in a table of encryption keys;

creating a set of encrypted frames by encrypting at least selected portions of selected frames of said sequence of frames using the frame encryption keys in accordance with a frame encryption function;

generating frame decryption information necessary to decrypt said set of encrypted frames; and

assembling said protected stream using at least said set of encrypted frames, unencrypted frames of said sequence of frames, and said frame decryption information;

> wherein said frame decryption information is synchronized with said set of encrypted frames.

Claim 1 has been amended to include the language "generating a frame encryption key and including the encryption key in a table of encryption keys". Applicants respectfully submit that the method of claim 1 including "generating a frame encryption key and including the encryption key in a table of encryption keys" is described in the specification of the above referenced application. For example, paragraph [0038] of the specification includes the following discussion of generation of frame keys, which includes both generation and selection of frame keys (emphasis added):

> ... Specifically, a decision may be made of whether or not to perform a key update at least in part based upon the value of the updated frame counter (step 706). If a key update is required, a new frame key is spontaneously generated or selected from an existing list of keys (step 708). In the exemplary embodiment, generation of the frame key can include a selection of a random or pseudorandom key. Once the new frame key has been generated, it is stored in a key table for later use during the encryption process (step 710) ...

Claim 1 has also been amended to include "creating a set of encrypted frames by encrypting at least selected portions of selected frames of said sequence of frames using the frame encryption keys in accordance with a frame encryption function". Applicants respectfully submit that the method of claim 1 including "creating a set of encrypted frames by encrypting at least selected portions of selected frames of said sequence of frames using the frame encryption keys in accordance with a frame encryption function" is described in the specification of the above referenced application. For example, support can be found in the above excerpt from paragraph [0038] and in paragraph [0036]:

> [0036] In the exemplary embodiment each frame encryption key is used to encrypt a predefined number of frames. That is, after a given encryption key has been used to encrypt the a number of frames, a new key is utilized to encrypt a possibly different number of subsequent frames. As indicated above, the frame decryption stream includes a key or key pointer

identifying the decryption key to be used in connection with decryption of each encrypted frame.

Claim 1 has also been amended to include "assembling said protected stream using at least said set of encrypted frames, unencrypted frames of said sequence of frames, and said frame decryption information". Applicants respectfully submit that the method of claim 1 including "assembling said protected stream using at least said set of encrypted frames, unencrypted frames of said sequence of frames, and said frame decryption information" is described in the specification of the above referenced application. For example, the Abstract of the above referenced application describes the following:

> A method for producing and for subsequently decrypting a protected stream of compressed video content is described herein. The method includes receiving an input stream of compressed video content containing a sequence of frames. A set of encrypted frames are created by encrypting selected frames of the sequence of frames in accordance with a frame encryption function. The method further includes generating frame decryption information necessary to decrypt the set of encrypted frames. In a particular implementation the protected stream is assembled using the set of encrypted frames, unencrypted frames from the input stream, and the frame decryption information. The decryption process is initiated by receiving the protected stream of compressed video content and the corresponding frame decryption information. In this regard the frame decryption information includes data distinguishing the encrypted frames from the unencrypted frames of the compressed video content within the protected stream. The encrypted frames are then decrypted in accordance with the frame decryption information.

Claim 1 has also been amended to include "wherein said frame decryption information is synchronized with said set of encrypted frames". Applicants respectfully submit that the amendment simply incorporates the limitations of originally submitted claim 8 into amended claim 1.

Support for claim 2

Claim 2 has been amended as follows:

2. The method of claim 1, wherein said frame decryption information includes references to frame encryption keys in the key table

~~said assembling further includes using unencrypted frames of said sequence of frames, said frame decryption information being synchronized with said set of encrypted frames~~.

Claim 2 has been amended to include "wherein said frame decryption information includes references to frame encryption keys in the key table". Applicants respectfully submit that the method of claim 2 including "wherein said frame decryption information includes references to frame encryption keys in the key table" is described in the specification of the above referenced application. For example, paragraph [0044] describes the following (emphasis added):

> [0044] FIG. 9 also depicts an encrypted video stream 950, which represents an encrypted version of the unencrypted video stream 900. In addition, FIG. 9 illustratively represents the frame decryption information 995 needed to properly decrypt the encrypted video stream 950. In the exemplary embodiment the decryption information 995 may be incorporated within or otherwise transmitted in conjunction with the encrypted video stream 950. Upon receipt at the location of the video decoder (FIG. 12), the decryption information will be stored within a table in a format consistent with the applicable compression protocol (e.g., MPEG-4) and referenced during the decoding process described below. In the embodiment of FIG. 9, the frame decryption information 995 identifies, with respect to each frame of encrypted video stream 950, the frame number, the status of encryption (on or off), the offset length, the number of bytes encrypted, and a reference to the applicable encryption key.

Support for claim 4

Claim 4 is amended as follows:

> 4. The method of claim [[2]]1, wherein said frame decryption information includes a reference to a decryption key in the key table~~information corresponding to encrypted frames within said protected stream~~.

Claim 4 has been amended to include "wherein said frame decryption information includes a reference to a decryption key in the key table". Applicants respectfully submit that the method of claim 4 including "wherein said frame decryption information includes a reference to a decryption key in the key table" is described in the

specification of the above referenced application. For example, paragraph [0044] describes the following (emphasis added):

> [0044] FIG. 9 also depicts an encrypted video stream 950, which represents an encrypted version of the unencrypted video stream 900. In addition, FIG. 9 illustratively represents the frame decryption information 995 needed to properly decrypt the encrypted video stream 950. In the exemplary embodiment the decryption information 995 may be incorporated within or otherwise transmitted in conjunction with the encrypted video stream 950. Upon receipt at the location of the video decoder (FIG. 12), the decryption information will be stored within a table in a format consistent with the applicable compression protocol (e.g., MPEG-4) and referenced during the decoding process described below. In the embodiment of FIG. 9, the frame decryption information 995 identifies, with respect to each frame of encrypted video stream 950, the frame number, the status of encryption (on or off), the offset length, the number of bytes encrypted, and a reference to the applicable encryption key.

Support for claim 11

Claim 11 is amended as follows:

> 11. (Currently Amended) The method of claim 9 further including maintaining counts corresponding to each of said frame types, said counts being used to determine when to ~~generate~~ use a new frame encryption key[[s]] ~~used~~ in said ~~of~~ encrypting of said selected frames.

Claim 11 has been amended to include "maintaining counts corresponding to each of said frame types, said counts being used to determine when to use a new frame encryption key in said encrypting of said selected frames". Applicants respectfully submit that the method of claim 11 including "maintaining counts corresponding to each of said frame types, said counts being used to determine when to use a new frame encryption key in said encrypting of said selected frames" is described in the specification of the above referenced application. For example, paragraph [0038] includes the following description (emphasis added):

> ... Once an unencrypted frame has parsed (step 702), a frame counter is incremented (step 704). In general, the frame counter may be used as part of the selection criteria for the type of encryption to be applied, as well as in determining whether the encryption key employed during previous encryption operations is to be changed. Specifically, a

decision may be made of whether or not to perform a key update at least in part based upon the value of the updated frame counter (step 706)...

Support for claim 14

Claim 14 is amended as follows:

14. (Currently Amended) A method for decrypting compressed video content comprising:

storing frame decryption keys;

receiving an input stream of compressed video content containing encrypted frames and unencrypted frames;

receiving frame decryption information necessary to decrypt said encrypted frames, said frame decryption information is synchronized with said set of encrypted frames and distinguish~~inges~~ said encrypted frames from said unencrypted frames; and

decrypting selected portions of said encrypted frames using a frame decryption function in accordance with said frame decryption information, which identifies the specific portions of the frames to be decrypted and the applicable frame decryption keys.

Claim 14 has been amended to include "storing frame decryption keys". Applicants respectfully submit that the method of claim 14 including "storing frame decryption keys" is described in the specification of the above referenced application. Methods in accordance with embodiments of the invention described in the specification of the above referenced application store encryption keys in a key table (see discussion of claim 1 above and paragraph [0038] of the specification). The encryption keys can be used for both encryption and decryption.

Claim 14 has also been amended to include "said frame decryption information is synchronized with said set of encrypted frames". Applicants respectfully submit that the method of claim 14 including "said frame decryption information is synchronized with said set of encrypted frames" is described in the specification of the above referenced application. For example, paragraph [0035] describes the following (emphasis added):

> [0035] In the embodiment of FIG. 6, all encrypted frames are tagged with the necessary information to be decrypted. Thus, once a frame has been encrypted per step 610, the information needed to decrypt the encrypted be can be added into a synchronized frame decryption stream (step 615). This synchronized frame decryption stream contains the information necessary decrypt all of the encrypted frames, and may include, for

example, encryption on/off status, encryption key or key pointer, offset value into the frame (i.e., the beginning of the encrypted portion of the frame), and size of the data field to be decrypted.

Claim 14 has also been amended to include "decrypting selected portions of said encrypted frames using a frame decryption function in accordance with said frame decryption information, which identifies the specific portions of the frames to be decrypted and the applicable frame decryption keys". Applicants respectfully submit that the method of claim 14 including "decrypting selected portions of said encrypted frames using a frame decryption function in accordance with said frame decryption information, which identifies the specific portions of the frames to be decrypted and the applicable frame decryption keys" is described in the specification of the above referenced application. For example, paragraph [0042] includes the following:

> ... If the retrieved decryption information indicates that the frame has been identified as encrypted, the frame is dispatched to a frame decryption routine (step 816). This decryption routine first retrieves, from the frame decryption information corresponding to the frame being decrypted, the intra-frame offset information (i.e., the offset into the frame at which the encrypted portion is located) and the size of the encrypted portion of the frame (step 820). This information enables the decryption routine to determine the specific portion of the frame to be decrypted. Once this frame portion has been determined, the decryption routine obtains the applicable decryption key from the received frame decryption information (step 830). Next, the encrypted portion of the frame is decrypted using the appropriate decryption key (step 840). The resultant unencrypted frame is then returned from the decryption routine and decompressed/decoded in the manner described below with reference to FIG. 12 (step 850).

Support for claim 17

Amended claim 17 is as follows:

> 17. The method of claim 14 wherein said frame decryption information includes a reference to a frame decryption key~~decryption key information corresponding to~~for each of said encrypted frames.

Claim 17 has been amended to include "said frame decryption information includes a reference to a frame decryption key". Applicants respectfully submit that the method of claim 17 including "said frame decryption information includes a reference to

a frame decryption key" is described in the specification of the above referenced application. For example, paragraph [0044] describes the following (emphasis added):

> [0044] FIG. 9 also depicts an encrypted video stream 950, which represents an encrypted version of the unencrypted video stream 900. In addition, FIG. 9 illustratively represents the frame decryption information 995 needed to properly decrypt the encrypted video stream 950. In the exemplary embodiment the decryption information 995 may be incorporated within or otherwise transmitted in conjunction with the encrypted video stream 950. Upon receipt at the location of the video decoder (FIG. 12), the decryption information will be stored within a table in a format consistent with the applicable compression protocol (e.g., MPEG-4) and referenced during the decoding process described below. In the embodiment of FIG. 9, the frame decryption information 995 identifies, with respect to each frame of encrypted video stream 950, the frame number, the status of encryption (on or off), the offset length, the number of bytes encrypted, and a reference to the applicable encryption key.

Support for claim 21

Amended claim 21 is as follows:

> 21. An encrypting digital video encoder comprising:
> a video processing unit for generating a plurality of input data streams in response to a sequence of uncompressed video frames;
> an entropy compression unit for creating, based upon said plurality of input data streams, compressed video content containing a sequence of compressed frames; and
> a video encryption module configured to transform said sequence of compressed frames into a protected video stream containing at least a set of encrypted frames and synchronized frame decryption information necessary to decrypt said set of encrypted frames;
> wherein the video encryption module also generates a table of encryption keys;
> wherein said frame decryption information includes references to encryption keys in the table of encryption keys.

Claim 21 has been amended to include "a protected video stream containing at least a set of encrypted frames and synchronized frame decryption information". Applicants respectfully submit that the invention of claim 21 including "a protected video stream containing at least a set of encrypted frames and synchronized frame decryption

information" is described in the specification of the above referenced application. For example, paragraph [0035] describes the following (emphasis added):

> [0035] In the embodiment of FIG. 6, all encrypted frames are tagged with the necessary information to be decrypted. Thus, once a frame has been encrypted per step 610, the information needed to decrypt the encrypted be can be added into a synchronized frame decryption stream (step 615). This synchronized frame decryption stream contains the information necessary decrypt all of the encrypted frames, and may include, for example, encryption on/off status, encryption key or key pointer, offset value into the frame (i.e., the beginning of the encrypted portion of the frame), and size of the data field to be decrypted.

Claim 21 has been amended to include "wherein the video encryption module also generates a table of encryption keys". Applicants respectfully submit that the invention of claim 21 including "wherein the video encryption module also generates a table of encryption keys" is described in the specification of the above referenced application. For example, paragraph [0038] of the specification includes the following discussion:

> ... Specifically, a decision may be made of whether or not to perform a key update at least in part based upon the value of the updated frame counter (step 706). If a key update is required, a new frame key is spontaneously generated or selected from an existing list of keys (step 708). In the exemplary embodiment, generation of the frame key can include a selection of a random or pseudorandom key. Once the new frame key has been generated, it is stored in a key table for later use during the encryption process (step 710) ...

Claim 21 has been amended to include "wherein said frame decryption information includes references to encryption keys in the table of encryption keys". Applicants respectfully submit that the invention of claim 21 including "wherein said frame decryption information includes references to encryption keys in the table of encryption keys" is described in the specification of the above referenced application. For example, paragraph [0044] describes the following (emphasis added):

> FIG. 9 also depicts an encrypted video stream 950, which represents an encrypted version of the unencrypted video stream 900. In addition, FIG. 9 illustratively represents the frame decryption information 995 needed to properly decrypt the encrypted video stream 950. In the

exemplary embodiment the decryption information 995 may be incorporated within or otherwise transmitted in conjunction with the encrypted video stream 950. Upon receipt at the location of the video decoder (FIG. 12), the decryption information will be stored within a table in a format consistent with the applicable compression protocol (e.g., MPEG-4) and referenced during the decoding process described below. In the embodiment of FIG. 9, the frame decryption information 995 identifies, with respect to each frame of encrypted video stream 950, the frame number, the status of encryption (on or off), the offset length, the number of bytes encrypted, and a reference to the applicable encryption key.

Support for claim 28

Claim 28 is amended as follows:

28. A[[n]] decrypting digital video decoder comprising:

a video decryption module configured to receive a protected input stream of compressed video content containing at least a set of encrypted frames and synchronized frame decryption information, said frame decryption information being necessary for decrypting said set of encrypted frames so as to form a set of decrypted frames;

an entropy decompression unit for creating, based at least in part upon said set of decrypted frames, a plurality of video data streams; and

a video processing unit for generating an output stream of uncompressed video content in response to said plurality of video data streams;

wherein said frame decryption information includes references to applicable encryption keys.

Claim 28 has been amended to include "a protected input stream of compressed video content containing at least a set of encrypted frames and synchronized frame decryption information". Applicants respectfully submit that the invention of claim 21 including "a protected input stream of compressed video content containing at least a set of encrypted frames and synchronized frame decryption information" is described in the specification of the above referenced application. For example, paragraph [0035] describes the following (emphasis added):

[0035] In the embodiment of FIG. 6, all encrypted frames are tagged with the necessary information to be decrypted. Thus, once a frame has been encrypted per step 610, the information needed to decrypt the encrypted be can be added into a synchronized frame decryption stream (step 615). This synchronized frame decryption stream contains the information

> necessary decrypt all of the encrypted frames, and may include, for example, encryption on/off status, encryption key or key pointer, offset value into the frame (i.e., the beginning of the encrypted portion of the frame), and size of the data field to be decrypted.

Claim 21 has been amended to include "wherein said frame decryption information includes references to applicable encryption keys". Applicants respectfully submit that the invention of claim 21 including "wherein said frame decryption information includes references to applicable encryption keys" is described in the specification of the above referenced application. For example, paragraph [0044] describes the following (emphasis added):

> [0044] FIG. 9 also depicts an encrypted video stream 950, which represents an encrypted version of the unencrypted video stream 900. In addition, FIG. 9 illustratively represents the frame decryption information 995 needed to properly decrypt the encrypted video stream 950. In the exemplary embodiment the decryption information 995 may be incorporated within or otherwise transmitted in conjunction with the encrypted video stream 950. Upon receipt at the location of the video decoder (FIG. 12), the decryption information will be stored within a table in a format consistent with the applicable compression protocol (e.g., MPEG-4) and referenced during the decoding process described below. In the embodiment of FIG. 9, the frame decryption information 995 identifies, with respect to each frame of encrypted video stream 950, the frame number, the status of encryption (on or off), the offset length, the number of bytes encrypted, and a reference to the applicable encryption key.

New claims 32 and 33

Applicants have added claims 32 and 33, which depend from claim 1. Applicants respectfully submit that support for claims 32 and 33 can be found throughout the specification including paragraphs [0049] – [0051].

Conclusion

In view of the foregoing amendment and response, it is believed that the application is in condition for allowance and, accordingly, reconsideration and allowance is earnestly solicited.

If any questions remain regarding the allowability of the application, Applicant would appreciate if the Examiner would advise the undersigned by telephone.

The Commissioner is hereby authorized to charge any fees under 37 CFR 1.16 and 1.17 which may be required by this paper to Deposit Account No. 03-1728. Please show our docket number with any charge or credit to our Deposit Account.

Respectfully submitted,

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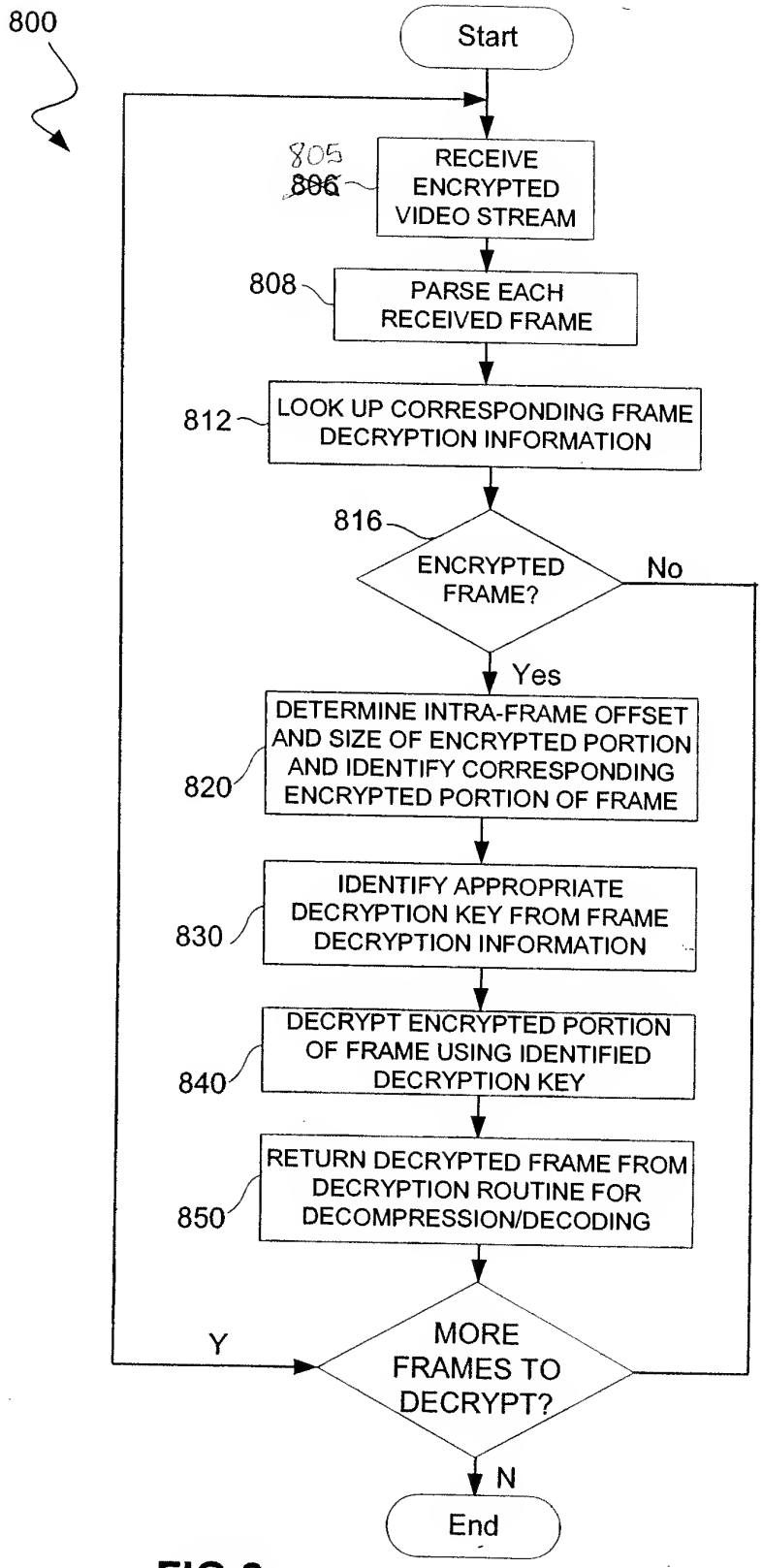
800
Start
805
806
RECEIVE ENCRYPTED VIDEO STREAM
808
PARSE EACH RECEIVED FRAME
812
LOOK UP CORRESPONDING FRAME DECRYPTION INFORMATION
816
ENCRYPTED FRAME?
No
Yes
820
DETERMINE INTRA-FRAME OFFSET AND SIZE OF ENCRYPTED PORTION AND IDENTIFY CORRESPONDING ENCRYPTED PORTION OF FRAME
830
IDENTIFY APPROPRIATE DECRYPTION KEY FROM FRAME DECRYPTION INFORMATION
840
DECRYPT ENCRYPTED PORTION OF FRAME USING IDENTIFIED DECRYPTION KEY
850
RETURN DECRYPTED FRAME FROM DECRYPTION ROUTINE FOR DECOMPRESSION/DECODING
Y
MORE FRAMES TO DECRYPT?
N
End

FIG 8